3. The sections are placed in water for a few minutes (not over five or ten), and then in a saturated aqueous solution of *methyl-blue* until stained deep blue.

4. They are then washed, and placed in a saturated aqueous solution of acid fuchsin for about five minutes.

5. The sections are next to be quickly washed, and placed for a *few seconds* in an alcoholic solution of caustic potash (1 per cent.), from which they are to be transferred at once to abundant water.

The color differentiation at once appears: The white matter becomes blue or violet, and the gray matter red. Bundles of fibres in longitudinal section appear to be made up partly of blue and partly of red fibres. Cross-sections show that the difference in color among the fibres is due to the presence in varying amount of two unlike substances in the medullary sheaths. These substances may be distinguished as *erythrophilous* (red) and *cyanophilous* (blue). The axis-cylinder is uniformly red, while the medullary sheaths are variegated. In some fibres the whole sheath is made up of cyanophilous matter, in others of erythrophilous matter. In the majority of the fibres, the sheath is composed of concentric layers, blue alternating with red.

In the gray matter of the spinal chord may be seen Gerlach's net-work of fine fibrils. Close examination shows that the fibril is differentiated into red axis-cylinder and blue medullary sheath.

Preparations after the above method are not permanent, but they sometimes keep for a year or more.

Such preparations show that the medullary sheath is a structure of more importance than has generally been supposed by physiologists and pathologists. The differences brought out by this process of double-staining appear to indicate a difference in function among the nerve-fibres. The division into *motor* and *sensory* fibres, as Sahli suggests, may not go to the root of the matter. The central nervous system may be built up on a much more complicated principle of division.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

KENT SCIENTIFIC INSTITUTE OF GRAND RAPIDS, MICH.—The following officers were elected to serve for the year 1888: President, E. S. Holmes; Vice-President, W. A. Greeson; Recorder, C. A. Whittemore; Corresponding Secretary, E. S. Holmes; Treas-

then washed a few minutes in water (until visible streams of the solution cease to issue from the preparation), before immersion in the staining fluid. The staining may be successful with celloidin sections, provided they are very thin. It is better, however, to remove the celloidin, and subject the sections again to the hardening fluid, preparatory to staining.

urer, Samuel L. Fuller; Director of Museum, W. A. Greeson; Curator of Museum, C. W. Carman; Librarian, Geo. E. Fitch. Board of Directors: for one year, Joel C. Parker; for two years, Wright L. Coffinberry; for three years, W. A. Greeson; for four years, Samuel L. Fuller; for five years, E. S. Holmes; for six years, J. W. Jones.

BIOLOGICAL SOCIETY OF WASHINGTON.—At the meeting held October 20th, 1888, the following communications were read: Mr. L. O. Howard, "An Apparatus for the Study of Underground Insects and Plant-Roots;" Prof. Lester F. Ward, "The King Devil;" Mr. J. B. Smith, "Some Remarks on Sexual Characters in Lachnosternum;" Dr. Theo. Gill, "The Families of Fishes."

November 3, 1888.—The following communications were read: Mr. F. H. Knowlton, "Fossil Wood and Lignites of the Potomac Formation;" Mr. W. H. Dall, "Observations on the Modifications of the Gill in Univalve Molluscs;" Dr. Theo. Gill, "Characteristics of the *Scatophagidæ;*" Dr. C. Hart Merriam, "Description of a New Species of *Arvicola* from the Black Hills of Dakota."

November 17, 1888.—Prof. Lester F. Ward, "A Comprehensive Type of Fossil Cryptogamic Life from the Fort Union group, with Lantern views;" Mr. F. H. Knowlton, "Illustrations of Fossil Wood and Lignites of the Potomac Formation with Lantern views;" Dr. Cooper Curtis, "Some sexual differences in Trichocephali;" Prof. B. F. Fernow, "Geotropism and Heliotropism of Trees;" Dr. Theo. Gill, "On the relations of the Pscychrolutidæ;" Dr. C. Hart Merriam, "Description of a new Ground Squirrel from California."

U. S. NATIONAL ACADEMY OF SCIENCES.—Papers read November, 1888, in New Haven.—I. "The Lunar Eclipse, July 22, 1888,"[1] by E. S. Holden. II. "The Zone Undertaking of the Astronomische Gesellschaft," by Lewis Boss; presented by A Hall. III. "The Rain-Fall of the North Atlantic Ocean,"[2] by Elias Loomis. IV. "A finished Breed of Horses,"[1] by W. H. Brewer. V. "A Systematic Study of the Action of Definitely Related Chemical Compounds upon Animals,"[1] by Wolcott Gibbs and Hobart Emory Hare. VI. "The Cretaceous Flora of North America," by J. S. Newberry. VII. "On the Zoological Relations of some Palæozoic Fishes," by J. S. Newberry. VIII. "The Evolution of the Mammalian Molar Teeth to and from the Tritubercular Type,"[2] by Henry F. Osborn; presented by E. D. Cope. IX. "Some Scientific Results of the Albatross Expedition from Washington to San Francisco,"[2] by L. A. Lee; presented

[1] Read November 13th.
[2] Read November 14th. The remainder read November 15th.

by A. E. Verrill. X. "Some Measurements of Relative Wavelengths," by A. A. Michelson and E. W. Morley. XI. "A New Mineral from Maine," by E. S. Dana. XII. "Remarks on the Expression of the Law of Attraction in the Stellar Systems," by C. H. F. Peters. XIII. "Notes on the Satellite of Neptune," by A. Hall. XIV. "The Problem of Soaring Birds," by G. K. Gilbert. XV. "The Laws of Corrasion," by J. W. Powell.

THE WESTERN SOCIETY OF NATURALISTS held its first annual meeting October 24th and 25th, 1888, in the Physical Lecture-room of the Illinois State University, Champaign, Ill. Twenty-six members, representing six States, were in attendance. The meeting was called to order by the President, Dr. S. A. Forbes, and welcomed to the State and to Champaign by Prof. T. J. Burrill, Vice-President of the University. The first paper, on the "Teaching of Botany," was by Dr. D. H. Campbell, of Indiana University. He advocated the logical method of beginning with the simple and leading up to the complex, even with pupils as young as those in the high-schools, and the constant use of the compound microscope. The discussion which followed showed considerable diversity of opinion as to method, but all were agreed in relegating the analysis of flowers to the background. The other paper of the afternoon was by Prof. W. J. Beal, of the Michigan Agricultural College, who gave an account of a museum of plant products.

In the evening, Dr. S. A. Forbes, of the Illinois State University, gave the presidential address, detailing the character, scope, and objects of the Society, and then Pres. T. C. Chamberlain, of the Wisconsin State University, detailed the methods of investigation in quaternary geology.

Thursday morning the following papers were read: "Collegiate Instruction in Physiology," by Prof. O. P. Jenkins, of DePauw University; "Collegiate Instruction in Geology," by Prof. Samuel Calvin, of Iowa University; and "Biology in the High School," by Prof. W. H. Hatch, of Rock Island. Prof. J. T. Burrill exhibited a convenient and compact apparatus for taking photographs of microscopic objects, and explained its use. Prof. O. P. Jenkins exhibited a simple microtome invented by Prof. J. P. Naylor, which would cut ribbons of sections, the thinness of which is only limited by the pitch of the screw and the edge of the razor, while the instrument could be manufactured at a profit for ten or fifteen dollars. The following officers were elected for the ensuing year: President, Dr. T. C. Chamberlain, of Madison, Wis.; Vice-Presidents, Prof. J. T. Burrill, of Champaign, Ill., Pres. D. S. Jordan, of Bloomington, Ind., Prof. Samuel Calvin, of Iowa City, Iowa; Secretary, Prof. J. S. Kingsley, of Bloomington, Ind.; Treasurer, Prof. John M. Coulter, of Crawfordsville, Ind. It was

voted to hold the next annual meeting in Madison, Wis., in October, 1889, the exact date to be set by the Executive Committee.

Friday afternoon, after the transaction of some business, Dr. S. A. Forbes and Prof. H. Garman presented an account of the methods of investigating the contagious diseases of insects. Dr. C. O. Whitman, after giving several hints in matters of microscopical and embryological technique, outlined his plans for an inland biological laboratory, for which he asked the co-operation and active support of the colleges and universities of the Northwest. Prof. W. A. Locy, of Lake Forest University, read a paper on the "Teaching of Zoology in Colleges." Prof. Josua Lindahl exhibited a simple instrument he had devised for obtaining the contours and outline sections of skulls and other objects. After passing the usual resolutions and also one expressing their interest and intention to aid in the establishment of the laboratory advocated by Dr. Whitman, the Society adjourned.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. —*Report of the committee to secure from Congress the abolition of the duties on scientific books and apparatus imported into this country.* —The committee made the following report:—

Shortly after its appointment Dr. J. S. Billings resigned, suggesting that a member from the West be selected to fill his place. Prof. Langley, president of the Association, therefore appointed Prof. A. H. Worthen, of Springfield, Ill., to the vacancy. Upon the death of Prof. Worthen, which followed not long after, Prof. S. A. Forbes of Champaign, Ill., was selected by Prof. Langley to fill his place.

The eastern members of the committee, Paof. J. R. Eastman and Prof. E. D. Cope, chairman, have held several meetings with the following results. The following resolution was adopted and signed by all the members:—

Resolved: That there shall be admitted to this country, free of duty, all books in languages other than English; of books in the English language all single copies sent to periodicals issued not oftener than once a week; all books issued by governments and scientific societies, and all other books not republished within a year after the first publication in an English-speaking country.

Also all apparatus, instruments and material to be used in scientific experiment or original research; decision as to the intention of the importer to rest with a committee of the U. S. National Academy of Sciences.

This resolution was placed in the hands of the Committee of Ways and Means of the House of Representatives of which the Hon. R. Q. Mills is chairman, through Hon. W. C. P. Breckinridge of Kentucky, one of its members. The resolutions were received with consideration and had the attention of the committee while engaged in framing what is known as the Mills Tariff Bill. The

recommendations contained in the resolutions were partially incorporated into the bill in the following language (H. R. 9051, p. 1 and 7).

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that on and after the first day of July, 1888, the following articles mentioned in this section, when imported, shall be exempt from duty:

"Bibles, books and pamphlets printed in other languages than English, and books and pamphlets and all publications of Foreign Governments, and publications of Foreign Societies, historical or scientific, printed for gratuitous distribution."

This provision, although not covering the case of scientific publications produced in England, is a great advance over previous legislation on the subject.

As it is probable that the Mills bill in its present shape will not pass the Senate, and as the Senate is preparing a tariff bill as a substitute for it, the resolutions of your committee have been submitted to the committee of the Senate engaged in preparing this bill, of which Senator W. B. Allison is chairman. There is every reason to believe that the suggestions therein contained will receive the respectful consideration of that committee.

It has been hoped that some relief from the tax on knowledge at present imposed by the government of the United States might be largely relieved by the operation of the bill which has passed both houses of Congress, known as the Chace copyright bill. Such relief would really result, in the case of scientific books of which the sale should be sufficiently large to justify their republication in this country by foreign publishers, since they would then cease to be imported; but, unfortunately, the books most needed by students engaged in original research in this country are generally of a kind that are not republished, owing to the limited demand for them relatively to other kinds of literature.

By resolution of the American Society of Naturalists, your committee has been made the recipient of the following preambles and resolutions, and its request for the presentation of the same to Congress:—

"Whereas, the cause of education in science is retarded by the restrictions placed by Congress on the importation of scientific books and apparatus: whereas we believe that advance in the arts and industries depends on the development of science and is impeded by the before-mentioned import duties, and that all restrictions on education and scientific research are unworthy of enlightened government: whereas the scientific books published abroad are absolutely essential to students and investigators, and are but rarely duplicated in this country: whereas the value of scientific apparatus is in nearly all cases dependent on the individuality of the maker: and whereas colleges and incorporated institutions are now permitted to import apparatus duty free, while private investigators, usually less able to afford expense, are obliged to pay duty, therefore

"*Be it resolved*, That ———— hereby requests the Representatives of the state of ———— in the Congress of the United States to use all pos-

sible efforts to have placed on the free list, books pertaining to the physical, natural and medical sciences, and apparatus intended for purposes of scientific research or of education : and further be it

"*Resolved*, That a copy of these preambles and resolutions be forwarded to each member of Congress."

These resolutions were sent, by resolution of the same society, to the faculties of the universities and colleges throughout the United States for their approval and signature. Replies expressing this approval and signed by the faculties, or their accredited officers, were received from the following institutions :—

The American Philosophical Society, Philadelphia; The Franklin Institute, Philadelphia ; the Academy of Natural Sciences, Philadelphia; the County Medical Society, Philadelphia ; the Society of Arts, Boston ; Brown University, Providence, R. I. ; Bryn Mawr College, Pa. ; Wellesley College, Mass. ; Iowa College, Iowa ; Michigan University, Ann Arbor, Mich. ; Wesleyan University, Middletown, Conn. ; Naval Academy, Annapolis, Md. ; Middlebury College, Vt. ; Hamilton College, Clinton, N. Y. ; Swarthmore College, Pa. ; Adelbert College, Ohio ; Williams College, Williamstown, Mass. ; College of the City of New York ; University of Alabama, Tuscaloosa, Ala. ; Lafayette College, Easton, Pa. ; Amherst Agricultural College, Amherst, Mass. ; Haverford College, Pa. ; Smith College, Mass. ; Columbian University, Washington, D. C. ; Stevens Institute of Technology, Hoboken, N. J. ; University of Indiana, Indiana ; Lehigh University, Bethlehem, Pa. ; University of California, Berkeley, Cal. ; Hobart College, New York ; College of Physicians and Surgeons, New York City ; University of North Carolina, N. C. ; Columbia College School of Mines, New York City ; Union College, New York ; Kenyon College, Ohio ; Northwestern University, Evanston, Ill. ; Marietta College, Ohio ; University of Virginia, Charlottesville, Va. ; Cornell University, Ithaca, N. Y. ; Hampden Sidney College, Va.

As regards the removal of duty from imported philosophical and scientific apparatus, your committee cannot report much progress. Our efforts have been mainly directed to the removal of the duty on books, under the belief that success in this direction will prepare the way for further advance. We have not, however, neglected this important subject. The Mills tariff bill thus refers to it (pp. 27 and 32) :

(p. 32.) "And on and after October first, 1888, in lieu of the duties heretofore imposed on the articles hereinafter mentioned in this section, there shall be levied, collected and paid the following rates of duty on said articles severally."

"Philosophical apparatus and instruments, twenty-five per centum ad valorem.

Your committee hope to be able to secure the total abolition of the duties on foreign books of science, and the great reduction, if not abolition, of those on apparatus. We base this hope on the activity in the direction of change in the existing laws on this subject, at present existing in Congress, and the evident desire of the representatives of both the great political parties of the country to legislate for the best interests of their constituents, as they understand them. At the moment of preparing this report it is not

possible to announce any final result of the action of your committee, but it is quite possible that improved legislation may be attained by the time of the meeting of the Association to which this report is made.

In conclusion we find that what is needed to effect the result desired, is a continuation of the effort, already commenced, of vigorous protest against the laws on the subject as at present existing; laws which obstruct knowledge at its fountain-head; which impose onerous burdens on a class which works gratuitously for the public good, and which place our country in a false position among the enlightened nations of the earth.

EDW. D. COPE, Philadelphia, *Chairman.*
J. R. EASTMAN, U. S. Naval Observatory, Washington, D. C.
S. A. FORBES, Champaign, Ill.

SCIENTIFIC NEWS.

—Dr. Paul Langerhans, formerly professor in Freiburg i. B., died in Funchal, Madeira, July 20th, 1888, aged forty-one years.

—A heavy earthquake shock was felt in the city of Mexico, September 6th, 1888. In its violence it exceeded any hitherto recorded there.

—Prof. Graf zu Solms-Laubach, of Tübingen, succeeds to Prof. de Bary's place as editor of the *Botanische Zeitung*, while Dr. Kohl, of Marburg, has accepted the position of editor of the *Botanische Centralblatt.*

—The Indiana Academy of Science will hold its fourth annual meeting at Indianapolis, December 25th to 27th. The address of the retiring President, Dr. J. P. D. John, will be given on the evening of the 25th. As last year the programme was crowded, it has been decided to organize four sections this year: A, Zoology; B, Botany; C, Chemistry, Physics, and Mathematics; D, Geology and Geography.

—The British Association at its Bath meeting made the following grants for Geology, Biology, Geography and Anthropology: Geological Record, £80; Erratic Blocks, £10; Volcanic Phenomena of Japan, £25; Volcanic Phenomena of Vesuvius, £20; Fossil Phyllopoda of the Palæozoic Rocks, £20; Eocene Beds of the Isle of Wight, £15; Fossil Secondary and Tertiary Plants of the United Kingdom, £15; Zoology and Botany of the West